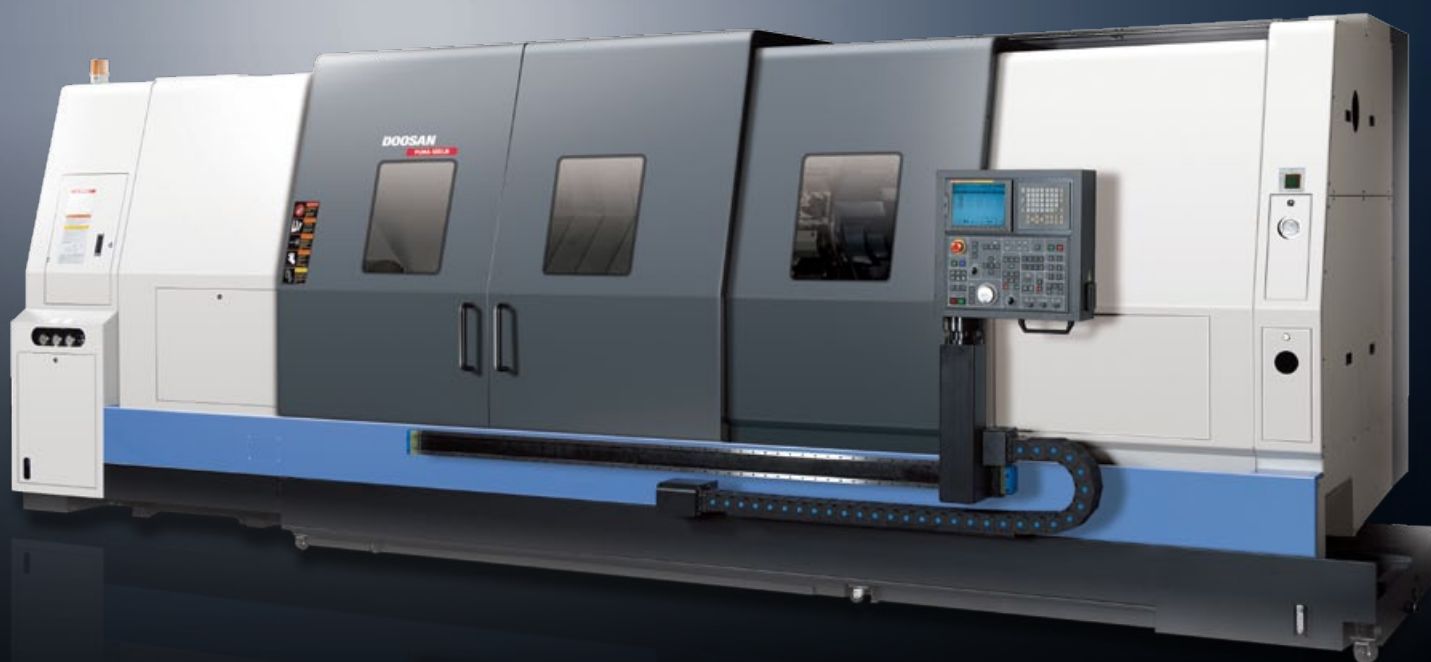




PUMA 600 / 700 / 800

Heavy Duty Turning Center



Doosan Machine Tools

Optimal Solutions for the Future

Heavy Duty Turning Center

PUMA 600 / 700 / 800



Massive yet Responsive Most Powerful Machines in Their Class.

The PUMA 600/700/800 series turning centers are the most powerful machines in their class. Designed for heavy and interrupted cutting, holding long term accuracies, and maintaining superior finishes. High metal removal rates along with rapid positioning and high speed turret indexing, guarantee unmatched cycle times when real performance is essential. Proven manufacturing techniques and ultra rigid construction are combined with advanced technological features to produce superior machine with exceptional values.



Main Spindle

Main Spindle Drive

The 45kW (60.3Hp) spindle motor provides power for heavy stock removal, greatly reducing the number of roughing passes required. The reliable digital AC spindle motor provides fast acceleration and is maintenance free. The preloaded spindle bearings are specifically calibrated to maintain the perfect balance of rigidity and speed. The geared headstock ensures optimal power throughout a wide speed range.

Max. spindle speed

1800 r/min [PUMA 600]

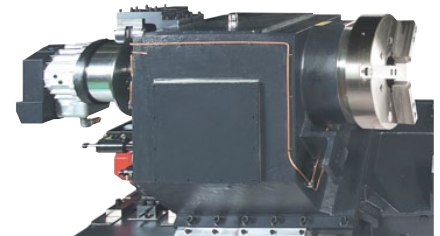
Motor (30 min)

45 kW (60.3 Hp)



Headstock and Spindle Construction

The headstock casting is made of Meehanite and ribbed on the outside to increase the surface area for better heat dissipation. The headstock and main spindle are manufactured in a temperature controlled environment then assembled and tested in our clean room. The heavy duty cartridge type spindle is supported by a double row of cylindrical roller bearings in the front and rear, with duplex angular thrust bearings in between. The cylindrical roller bearings feature a large contact surface which ensures the highest rigidity for heavy loads and superior surface finishes. All spindle bearings are permanently grease lubricated precision class P4.

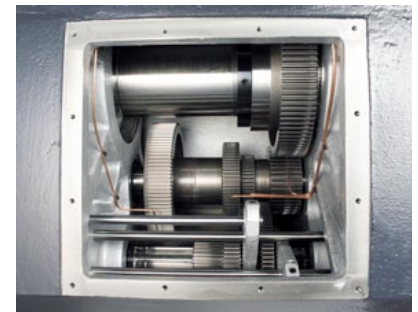


Geared Head

Power is delivered to the spindle through a three (PUMA 600/L/M/LM, 700/L/M/LM) or two (PUMA 800/L/M/LM, PUMA 800B) speed geared head allowing stable spindle speeds change as well as powerful torque.

Third gear (PUMA600/L/M/LM, 700/L/M/LM)

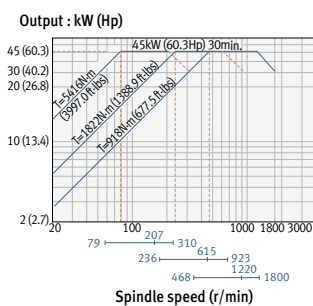
Second gear (PUMA 800/L/M/LM/B)



Main spindle power-torque diagram

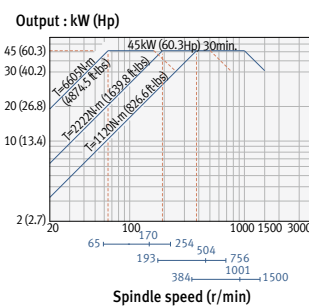
PUMA 600/600L/600M/600LM

Max. spindle speed **1800** r/min



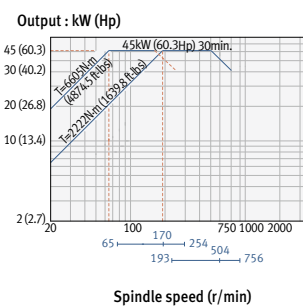
PUMA 700/700L/700M/700LM

Max. spindle speed **1500** r/min



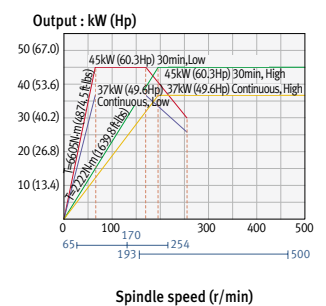
PUMA 800/800L/800M/800LM

Max. spindle speed **750** r/min



PUMA 800B

Max. spindle speed **500** r/min



Turret

Heavy Duty Turret

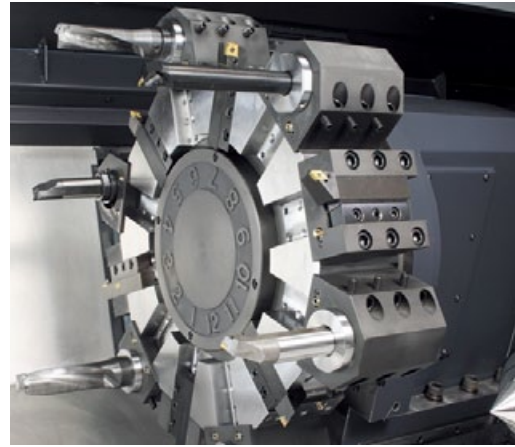
The large 12 station heavy duty turret features a large Curvic coupling diameter. This heavy duty design provides unsurpassed rigidity for heavy stock removal, fine surface finishes.

Index time (1-station swivel)

0.25 s

No. of tool station

12 ea



Preci-Flex Ready Rotary Tools

Preci-Flex ready rotary tool holders are available on the milling versions. Preci-Flex is a tooling system utilizes the existing ER collet taper in the rotary holders. The spindle face is precision ground relative to the taper and there are four drilled and tapped holders in this face. The Preci-Flex adapters locate on both the taper and the spindle face for maximum rigidity.

Collet application



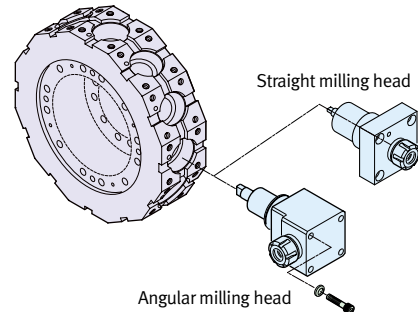
Preci-flex adapter application



Radial BMT Turret

The turret for rotary tool head features BMT style tooling in which the tool holders are mounted directly to the turret's periphery using 4 large bolts.

This type of mounting system allows an extremely high degree of rigidity



Turret Saddle

The turret saddle is made from the same fine grained Meehanite process cast iron as the main casting and headstock casting. This ensures that any vibration or harmonics from the cut will be virtually eliminated. The X axis guideways are the wide wrap around rectangular type for unsurpassed long-term rigidity and accuracy.



Rotary tool spindle power-torque diagram

PUMA 600M[LM]/

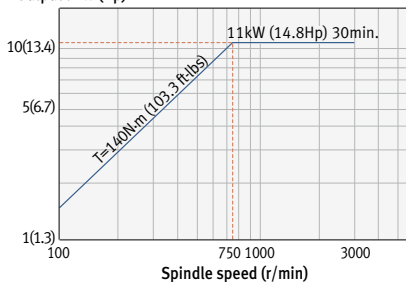
700M[LM]/800M[LM]

Spindle motor

11 kW (14.8Hp) /

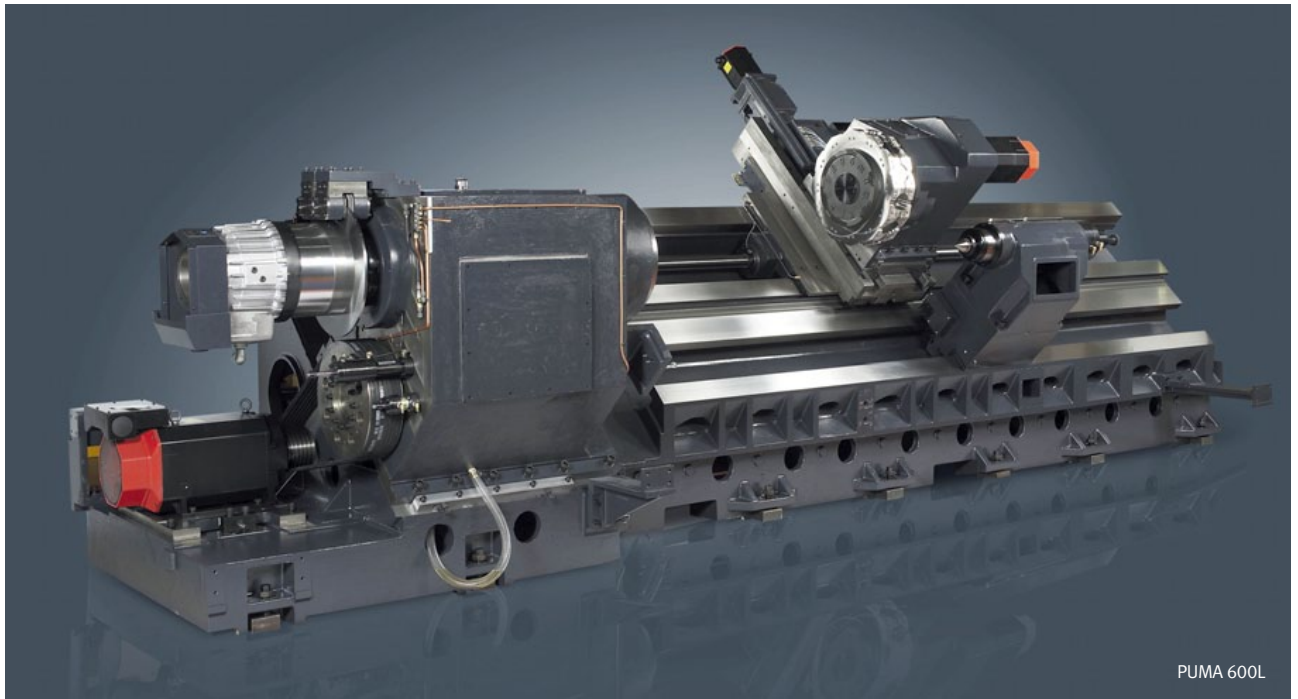
30 min

Output : kW (Hp)



Bed and Way Construction

Doosan Infracore precision machine tools are internationally known for their durability, rigidity and high accuracy. Only well proven and time tested manufacturing techniques can produce machines of this quality.



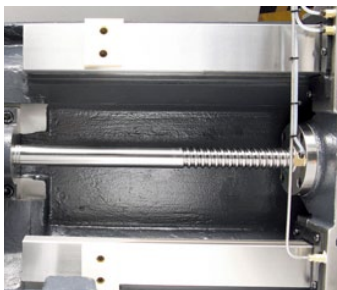
The PUMA 600/700/800 series is a true 45 degree slant bed design. The bed is a one piece casting with both the saddle and tailstock guideways in the same plane to eliminate thermal distortion. The heavily ribbed torque tube design prevents twisting and deformation. Fine grain Meehanite processed cast iron is used because of its excellent dampening characteristics. This ensures high rigidity with no deformation during heavy cutting. The slant angle allows for easy loading, changing and inspection of tools. All guideways are wide wrap-around rectangular type for un-surpassed long-term rigidity and accuracy. The guideways are widely spaced to ensure stability and fully protected. Each guide-way is induction hardened and precision ground. A fluoro plastic resin, Rulon® 142, is bonded to the mating way surfaces, for its wear and friction characteristics and then hand scraped for a perfect fit and center height. Optional long bed enables extra-long shaft machining.

Rapid Traverse

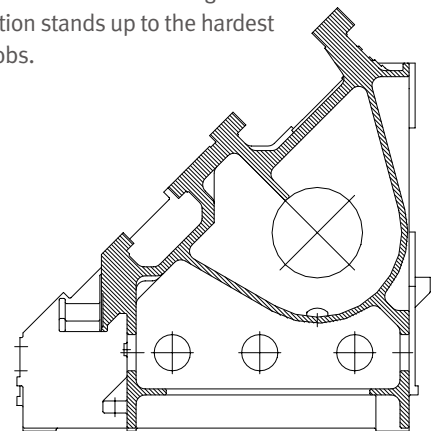
Scraping of Slideway



Outstanding rigidity for high feedrates



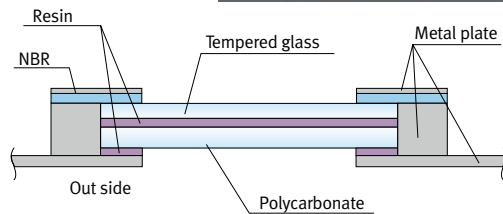
Slant-design bed makes the work go smoother, chip removal much easier. Tough tubular construction stands up to the hardest cutting jobs.



Human Friendly

Double-Paneled Safety Window

The operator safety can be enhanced through the front door with its shock absorbing laminated glass and double panel construction. The windows without grating also provide a clear view of the machine inside.



Operator's Panel

The operator control panel is mounted on an adjustable pendant for easy viewing and accessibility during set-up and operation. The layout and location of the panel is ergonomically designed to be efficient and convenient for the operator. Comprehensive alarm diagnostics are provided for the machine, control and programming error.

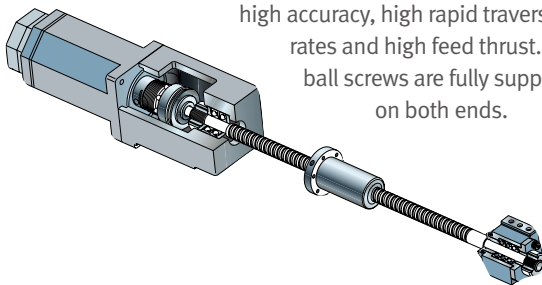


Axis Drive Construction and Tail Stock

Double Pretensioned Ball Screw

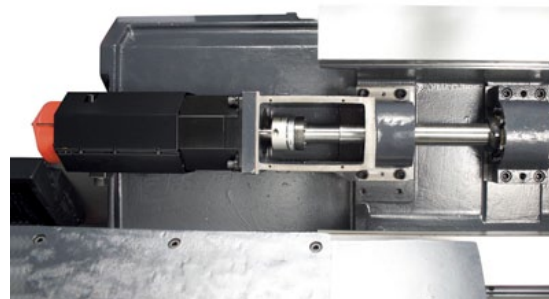
The X and Z axes features a double pretensioned ball screw, supported on each end by precision class P4 angular contact thrust bearings. Both axes are driven by large diameter, high precision ball screws.

Each ball screw has been carefully selected to achieve a combination of high accuracy, high rapid traverse rates and high feed thrust. All ball screws are fully supported on both ends.



Axis Drives

Each axis is powered by a maintenance free digital AC servo motor. These high torque drive motors are connected to the ball screws without intermediate gears for quiet and responsive slide movement with virtually no backlash.



Programmable Tailstock

The programmable tailstock body is mounted on the same guideway surface as the headstock. The heavy casting, large 160 mm diameter quill, and precision Morse Taper #6 live center provide outstanding rigidity. The 150 mm quill stroke is activated by either the program or foot switch. Auto lubrication is provided to the quill and guideways.

Note) Above picture is Programmable tailstock with Built-in center(Optional)



Eco-Friendly Design

Metered Way Lubrication



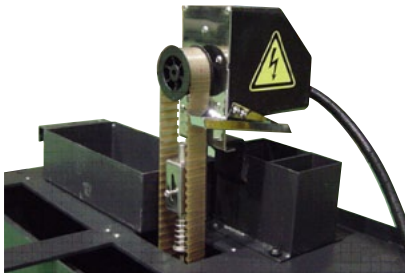
Automatic lubrication is provided to all guideways, ball screws and the tailstock quill. A maintenance free piston distributor delivers a precise quantity of oil to each lubrication point. The 4.3 L (1.1 gallon) reservoir lasts up to 80 hours. A low level alarm prevents the machine from restarting without lubricant.

Coolant System



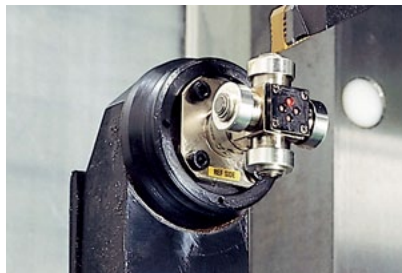
The high pressure flushes chips out of drilled holes, reduces the need for peck drill cycles, meets the requirements of most insert drill manufacturers and significantly increases tool life. The separate, large 410 L (108.3 gallon) {Long bed type : 570 L (150.6 gallon)} capacity coolant tank and chip pan are separate from the machine bed to prevent heat transfer and easy cleaning.

Oil Skimmer opt.



The coolant is kept clean and its life is extended with bed casting channels from the Z axis to a separate reservoir. A belt oil skimmer picks up and removes waste oil from the coolant tank that is easily drained.

Tool Pre-Setter opt.



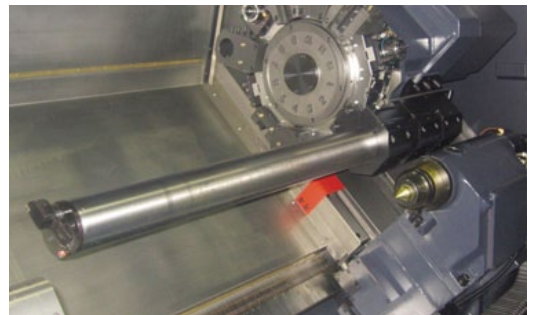
The automatic tool setter reduces set-up time by minimizing the need for skim cuts, measurements and entering tool offsets. The tool setting arm is moved by an electric motor and can be controlled through the program.

Hydraulic Power Unit



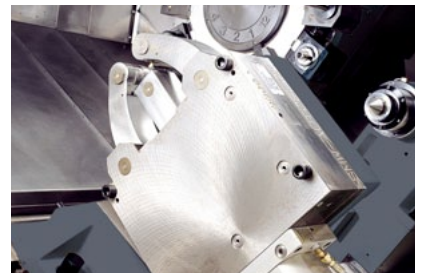
The temperature of the hydraulic oil is regulated by a cooling system.

Long Boring Bar opt.



By applying the long boring bar, users could get the deep and long hole of high precision at a time when they make a hole at the workpiece. Also long boring bar is very helpful to save the cutting time. It leads the customer's convenience and the enlargement of flexible using of the product.

Hydraulic Steady Rest opt.



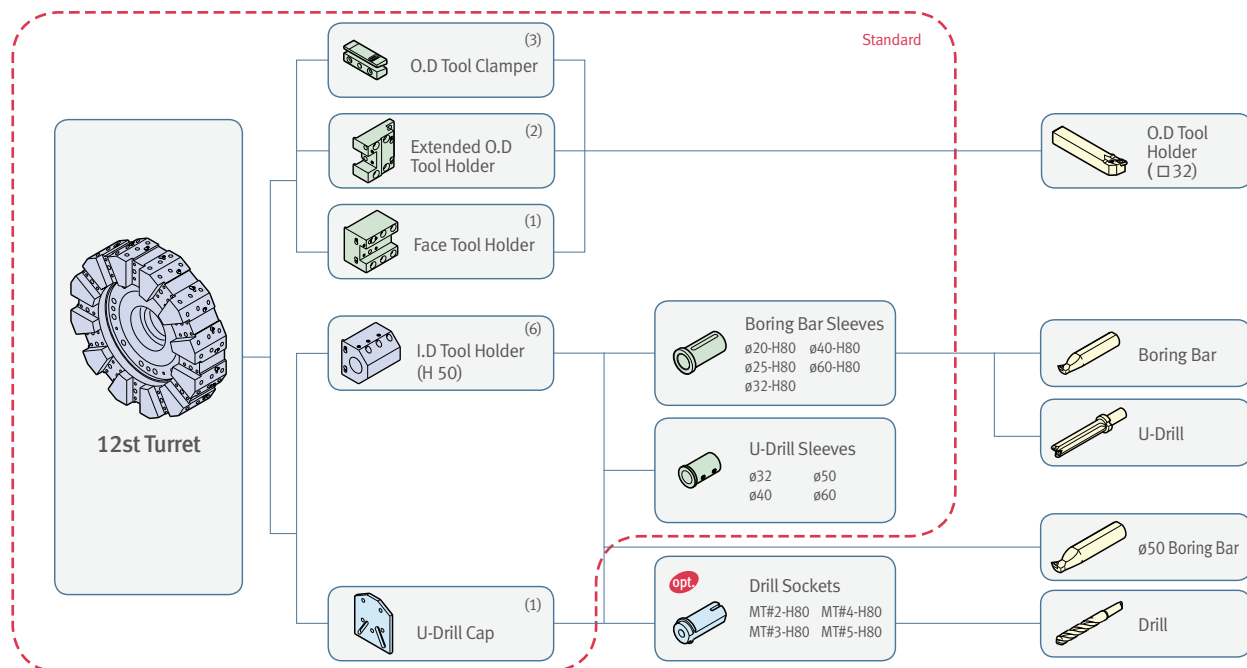
3 roller bearings supported steady rest assures smooth & heavy duty cut when cutting the long & slender parts.

Note) Before confirming customer order, Please contact with Doosan R&D department.
Turret indexing is impossible when mounting and using long boring bar.

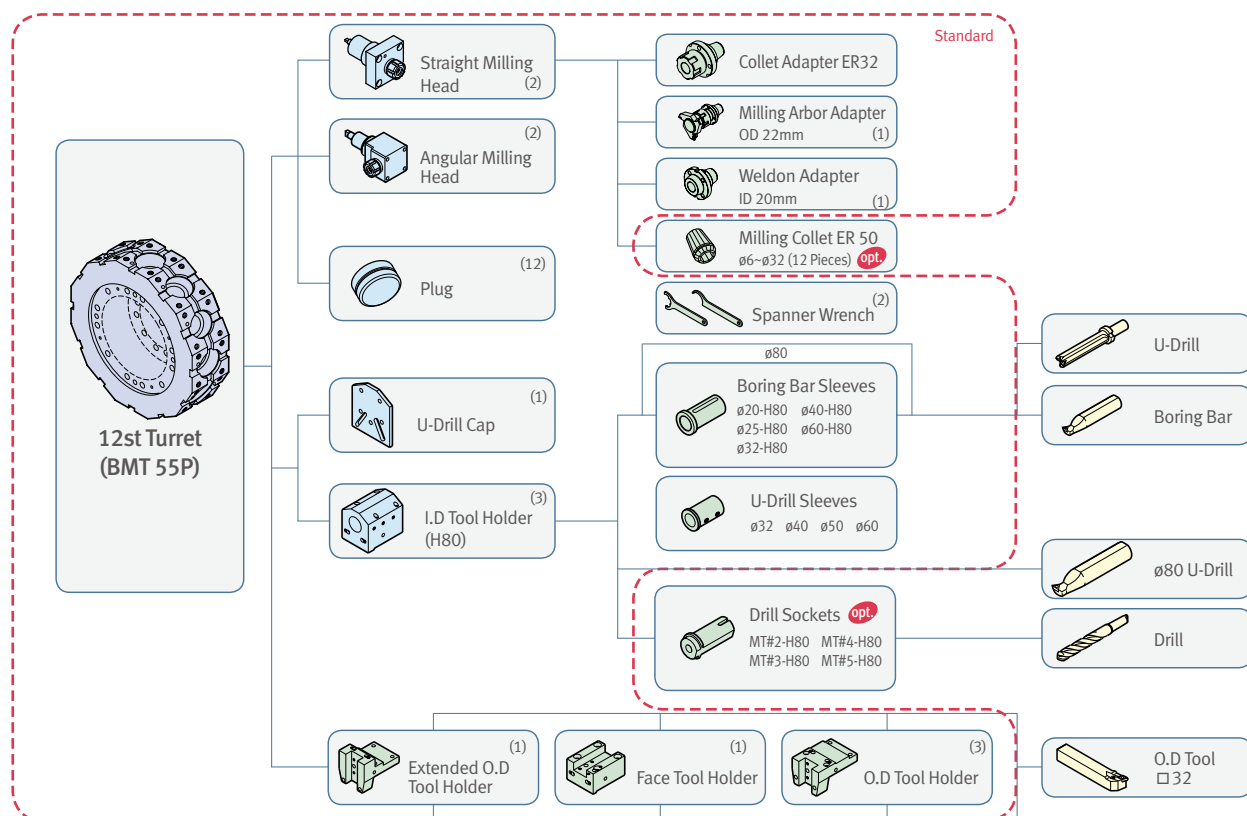
Tooling System

PUMA 600[L] / 700[L] / 800[L]

Unit : mm (inch)



PUMA 600M[LM] / 700M[LM] / 800M[LM]



Note) Above tooling system is our recommendation.

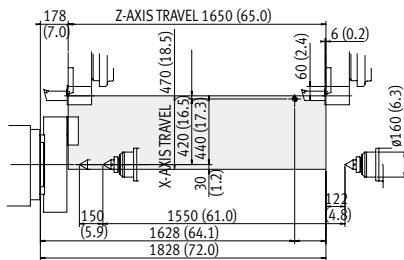
Depending on export condition, the standard tooling packed with the machine can be different.

Working Range

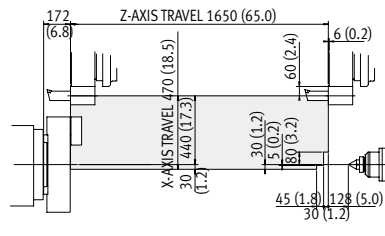
PUMA 600/700/800

Unit : mm (inch)

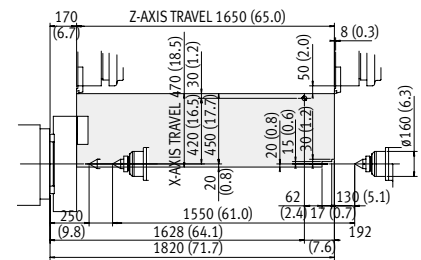
Stroke Diagram



ID Tool Holder

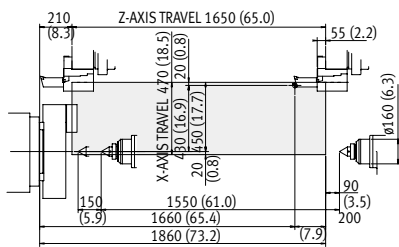


OD Tool Holder

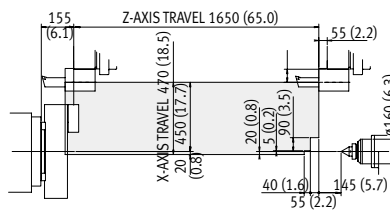


PUMA 600M/700M/800M

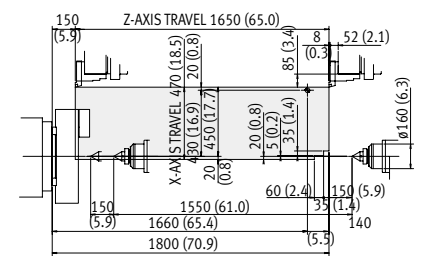
Stroke Diagram



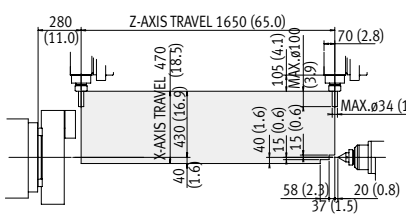
ID Tool Holder



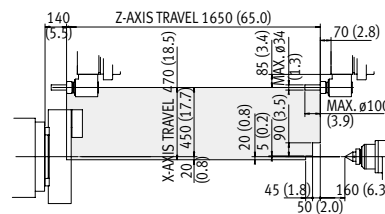
OD Tool Holder



Straight Milling Unit



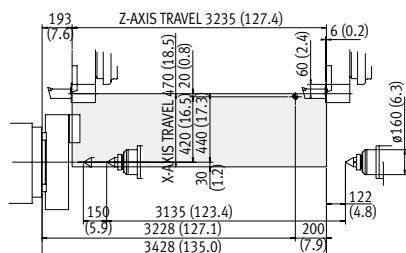
Angular Milling Unit



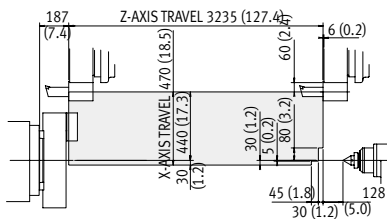
PUMA 600L/700L/800L

Unit : mm (inch)

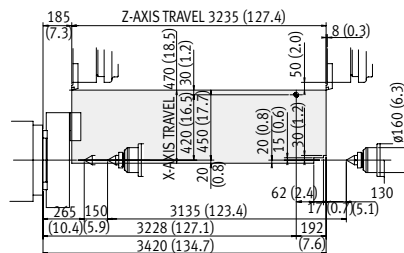
Stroke Diagram



ID Tool Holder

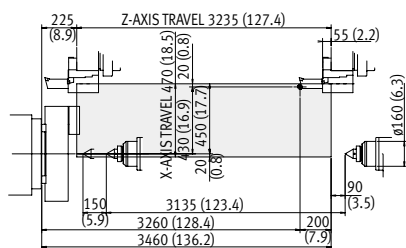


OD Tool Holder

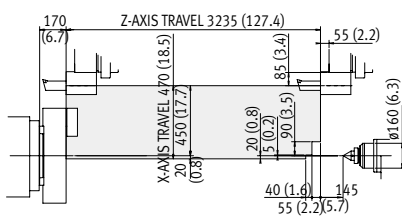


PUMA 600LM/700LM/800LM

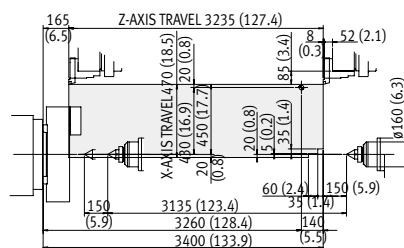
Stroke Diagram



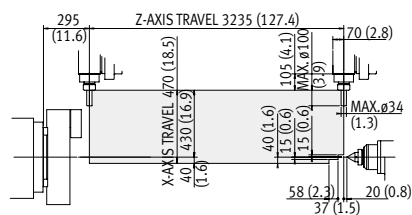
ID Tool Holder



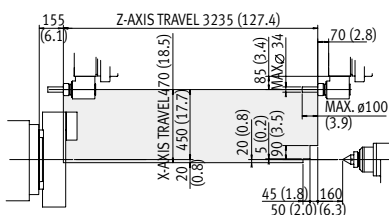
OD Tool Holder



Straight Milling Unit

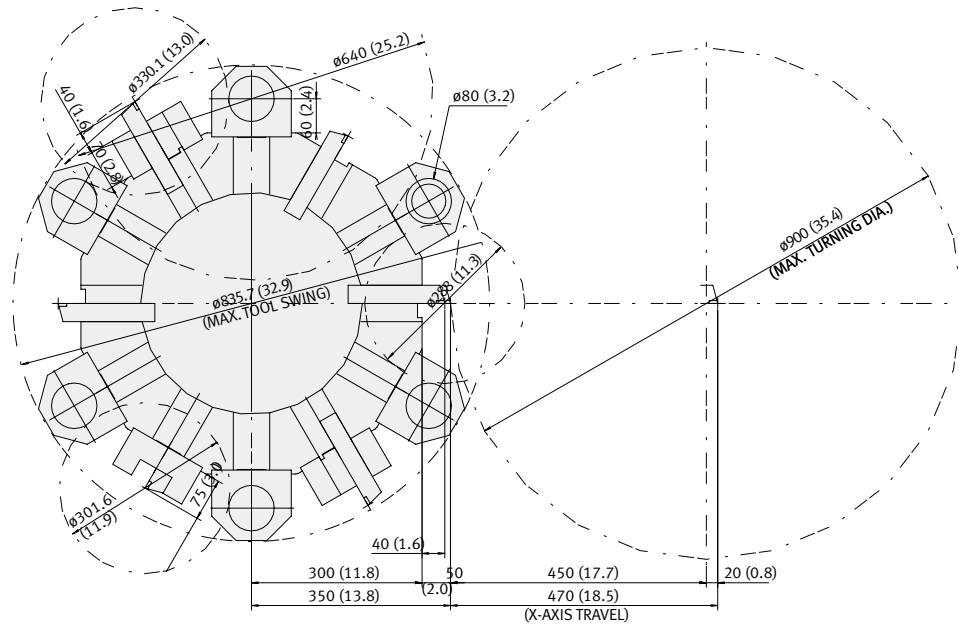


Angular Milling Unit

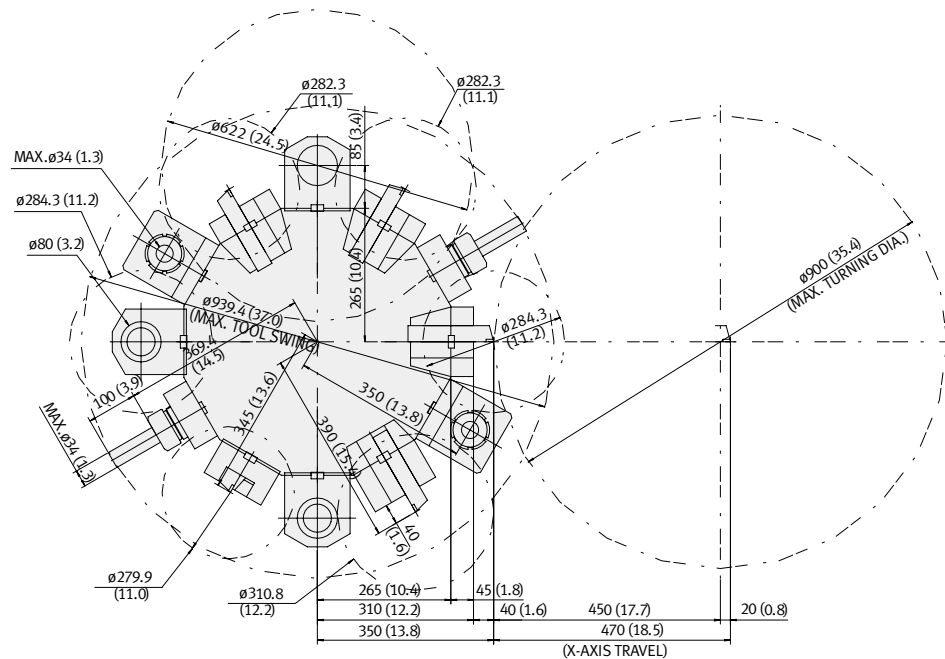


PUMA 600[L]/700[L]/800[L]

Unit : mm (inch)



PUMA 600M[LM]/700M[LM]/800M[LM]

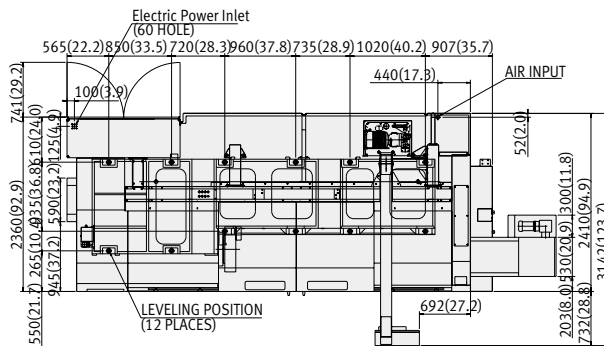


External Dimensions

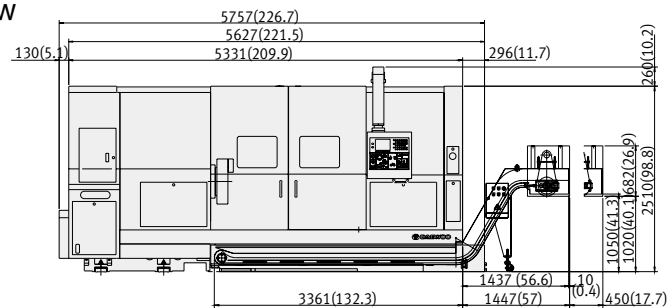
PUMA 600[M]/700[M]/800[M]

Unit : mm (inch)

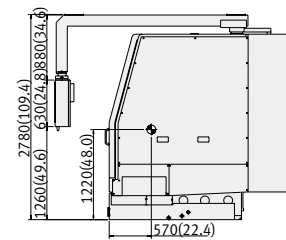
Top View



Front View

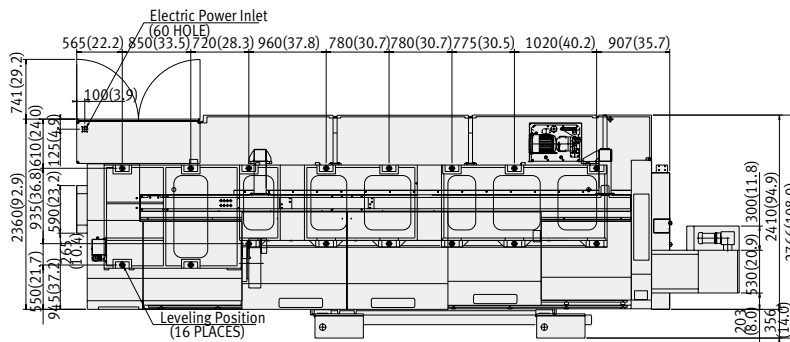


Right View

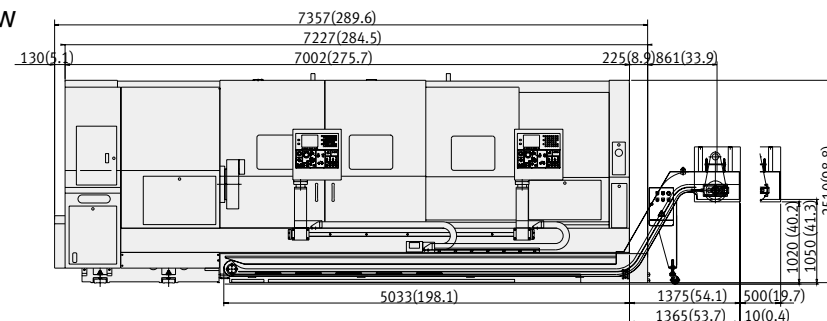


PUMA 600L[LM]/700L[LM]/800L[LM]

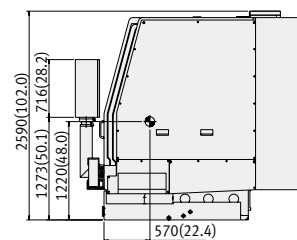
Top View



Front View



Right View



Machine Specifications (PUMA 600/700/800)

	Description		Unit	PUMA 600[L]	PUMA 700[L]	PUMA 800[L]	PUMA 600M[LM]	PUMA 700M[LM]	PUMA 800M[LM]	PUMA 800B	
Capacity	Swing over bed		mm (inch)	1030 (40.6)							
	Swing over saddle		mm (inch)	800 (31.5)							
	Recom. turning diameter		mm (inch)	600 (23.6)	700 (27.6)	800 (31.5)	600 (23.6)	700 (27.6)	800 (31.5)		
	Max. turning diameter		mm (inch)	900 (35.4)							
	Max. turning length		mm (inch)	1600 [3200] (63.0 [126.0])							1600 (63.0)
	Bar working diameter		mm (inch)	117 (4.6)	164 (6.5)	Depending on chuck	117 (4.6)	164 (6.5)	Depending on chuck		
Carriage	Travel distance	X-axis	mm (inch)	470 (20+450) (18.5 (0.8+17.7))							
		Z-axis	mm (inch)	1650 [3235] (65.0 [127.4])							
Feedrate	Rapid traverse	X / Z	m/min (ipm)	12/16 (472.4/629.9)[12/10 (472.4/393.7)]						12/16 (472.4/629.9)	
	Max. cutting feedrate	X / Z	mm/rev (ipr)	500 / 500 (19.7/19.7)							
Main Spindle	Spindle speed		r/min	1800	1500	750	1800	1500	750	500	
	Spindle nose		ASA	A2 #15	A1 #15	A1 #20	A2 #15	A1 #15	A1 #20	ISO 702-4 NO.20	
	Spindle bearing diameter (Front)		mm (inch)	200 (7.9)	240 (9.5)	400 (15.8)	200 (7.9)	240 (9.5)	400 (15.8)	440 (17.3)	
	Spindle through hole		mm (inch)	152 (6.0)	181 (7.1)	320 (12.6)	152 (6.0)	181 (7.1)	320 (12.6)	375	
	Cs spindle index angle		deg	-				360			-
Turret	No. of tool station		ea	12							
	OD tool height		mm (inch)	32 x 32 (1.3 x 1.3)							
	Boring bar diameter		mm (inch)	ø 80 (3.2)							
	Indexing time (1st swivel)		s	0.25							
	Rotary tool spindle speed		r/min	-				3000			-
Tail Stock	Quill diameter		mm (inch)	160 (6.3)							
	Quill bore taper		MT#	MT#6							
	Quill travel		mm (inch)	150 (5.9)							
Motors	Main spindle motor (cont / 30min)		kW (Hp)	37 / 45 (49.6 / 60.3)							
	Servo motor X / Z		kW (Hp)	4.0 / 9.0 (5.4 / 12.1)							
	Max. Spindle torque		N-m (ft-lbs)	5416	6605		5416	6605			
	Max. Rotary tool motor		kW (Hp)	-				11 (14.8)		-	
	Max. Rotary tool torque		N-m (ft-lbs)	-				140 (103.3)		-	
Power Source	Electric power supply (Rated capacity)		kVA	64.44			68.6			64.44	
Machine Size	Machine height		mm (inch)	2780 [2590] (109.5 [102.0])							
	Machine demension	length	mm (inch)	5760 [7360] (226.8 [289.8])							
		width	mm (inch)	3145 [2770] (123.8 [109.1])							
	Machine weight		kg (lb)	16300 [21800] (35934.8 [48060.1])				16500 [21800] (36375.7 [48060.1])			16300 (35934.8)
Chuck				Option							

* : No chuck, No cylinder

Standard Feature

- Coolant supply equipment
- Full enclosure chip and coolant shield
- Hand tool kit, including small hand tool for operations
- Hydraulic actuating cylinder
- Hydraulic power unit
- Leveling jack screw & plates
- Lubrication equipment
- Programmable Tailstock & Live center
- Standard tooling kit (tool holder & boring sleeve)
- Work light (2[3]sets)

Optional Feature

- Air blast for chuck jaw cleaning
- Arbor type mill holder
- Automatic door with safety device
- Automatic measuring system (in process touch probe)
- Automatic power off
- Chip bucket
- Chip conveyor
- Controller : Fanuc 32i-A
- Dual chucking pressure
- Hardened & ground jaws
- High pressure coolant pump
- Hydraulic chuck & chuck adapter
- Hydraulic steady rest
- Manual steady rest
- Oil skimmer
- Pressure switch for chucking pressure check
- Programmable tailstock & Built-in center (MT#6)
- Signal tower (yellow, red, green)
- Tool monitoring system
- Tool pre-setter (Hyd.) [PUMA 600/700]
- Twin chuck system [PUMA 800 / 800B]

- The specifications and information above-mentioned may be changed without prior notice.
- For more details, please contact Doosan

NC Unit Specifications

FANUC 32i-A

	Item	Spec.	Fanuc 32i-A
Controls	Controlled axes		X,Z,C(!)
	Simultaneously controlled axes	Std. 2 axes	3 axes(!)
Axis Functions	Backlash compensation	0~±9999 pulses	○
	Cs contouring control		○(!)
	Follow-up / Chamfering on/off		○
	HRV2 control		○
	Least input increment	0.001 mm / 0.0001"	○
	Stored stroke check1		○
Operation	Automatic operation (memory) / Buffer register		○
	Handle incremental feed	X1, X10, X100	○
	Search function	Sequence NO. / Program NO.	○
Interpolation	1st, 2nd reference position check / return G27 / Manual / G28 / G30		○
	Circular interpolation	G02	○
	Continuous threading		○
	Dwell	G04	○
	Linear interpolation	G01	○
	Multiple threading / Thread cutting retract		○
	Polar coordinate interpolation	G12.1, G13.1	○(!)
	Thread cutting / Synchronous cutting		○
Feed Functions	Feed per minute / Feed per revolution		○
	Feedrate override	0 - 200 % (10 % unit)	○
	Jog feed override	0 - 2000 mm/min	○
	Rapid traverse override	F0 / 25 / 100 %	○
	Tangential speed constant control		○
Auxiliary & Spindle Functions	Spindle orientation		○
	Constant surface speed control		○
	M-function	M3 digit	○
	Multi-spindle control		○(!)
	Rigid tapping		○
Programming Functions	Spindle speed override	0~150 %	○
	Absolute / Incremental programming		○
	Canned cycle for drilling / Turning	G80 series	○
	Custom macro		○
	Decimal point programming / pocket calculator type decimal point programming		○
	Direct drawing dimension programming		○
	EZ Guide i	Conversational programming	○
	Maximum program dimension	± 9 digit	○
	Multi repetitive canned cycle	G70~G76	○
	Multi repetitive canned cycle 2		○
	Optional block skip	9 piece	○
	Sequence number	N8 digits	○
	Programmable data input	G10	○
	Sub program call	10 folds nested	10
	Tape format for FANUC series 10/11		○
	Tape format for FANUC series 15		-
Tool Functions	Work coordinate system selection	G52 ~ G59	○
	Tool offset	G43, G44, G49	○
	Tool monitoring system		Opt.
	Direct input of tool offset value measured B		○
	Tool geometry / wear compensation	Geometry & wear data	○
	Tool life management		○
	Tool nose radius compensation		○
	Tool number command (T-code function)	T2+2 digits	○
	Tool offset pairs		64
	Tool offset value counter input		○
Editing op. Functions	Background editing		○
	Expanded part program editing	Copy, Move, Change of NC program	○
	No. of Registered programs		500ea
	Part program editing / Program protect		○
Setting & Display	Part program storage length*1		640m
	Display of spindle speed and T-code at all screen		○
	Help function	Alarm&Operation display	○
	Self diagnostic function		○
	Servo setting screen / Spindle setting screen		○
Data input & Output	Status display		○
	External key input / External data input		○
	External work number search	15 points	○
	I/O interface	RS-232C	○
	Memory card input and output		○
Other Functions	Reader puncher control	CH1 interface	○
	Ethernet function	Embedded ethernet function	○
	MDI / DISPLAY unit		10.4" Color LCD
	PMC system		○

○ : Standard OPT : Option (!) : only M type

*1 : Standard Part program length is different on export condition. On the addition of optional functions, its length can be reduced.



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- The specifications and information above-mentioned may be changed without prior notice.
- For more details, please contact Doosan.

